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ABSTRACT

Gangestad and Snyder (1985) have proposed two types of personality variables: continuous variables (characteristics possessed to some degree by all individuals) and class variables (characteristics distributed into discrete classes). This study examined whether alcoholism could be classified as a class variable. Because a class variable will exhibit a particular pattern among the covariance of its indicators, a pilot study was conducted to identify 10 indicators from the Drinking History Questionnaire, the MacAndrew Scale, the Comprehensive Drinker Profile, the Mortimer Filkens Test, and the Western Personality Inventory. The indicators were given to 125 male alcoholics and to 200 male nonalcoholics. Covariance among the items was plotted by level of response to the indicators. The covariance between each possible item pair was plotted for eight levels of responses to the indicators. The plot of the covariance among items by level of response to the indicators peaked toward the middle, indicative of the existence of a class variable. A high level of agreement between the simplest base rate estimation and the proportion of alcoholics in the sample provided support for the results. These findings suggest that alcoholism has a latent class variable underlying its development. A class variable, with its specific etiology, is much more likely to be genetic in origin than is a continuous variable, with its diffuse etiology. This finding has implications for the treatment and prevention of alcoholism. (NB)

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ALCOHOLISM AS A DISCRETE PERSONALITY VARIABLE: IMPLICATIONS FOR ITS HERITABILITY AND TREATMENT

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According to Gangestad and Snyder (1985), there are at least two types of personality variables: continuous variables and class variables. Continuous variables are dimensions or characteristics possessed to some degree by all individuals. Psychologists commonly refer to them as traits. For example, impulsivity--as measured by the Personality Research Form (Jackson, 1974)--is often thought to be on a continuum. Some people are more impulsive while others are less impulsive; however, all carry the trait or variable of impulsivity.

The other type of personality variable referred to by Gangestad and Snyder is the class variable. Class variables, as opposed to continuous variables, are not distributed on a continuum but rather are distributed into discrete classes. Class variable theory suggests that individuals differ not in degree but in kind. For example, if we now assume that impulsivity is a class variable with only two categories, we imply that only people belonging to one category have the trait of impulsivity; those belonging to the other category do not possess the trait.

Gangestad and Snyder (1985) argue that if comparative individual differences can be distributed either as continuous dimensions or discrete classes then we may ask whether any specific difference between individuals is properly conceptualized as a continuous or as a class variable. For purposes of this paper, the question then becomes: "Is alcoholism a class variable, possessed by only certain individuals and not

by others, or is it on a continuous dimension possessed in some degree by all individuals?" If it is a discrete variable with two classes, then individuals belong to either the discrete class of alcoholics or to the discrete class of nonalcoholics, and this has very specific implications for the treatment of alcoholism.

Detection of the presence of a class variable in alcoholism could be of special interest in the debate surrounding the questions: (a) Is alcoholism heredity? (b) Can alcoholics be taught to control their drinking? A class variable may be more strongly argued to be hereditary and one who carries a gene (complex) for alcoholism may never find it possible to engage in controlled drinking.

The argument for a class model of personality versus a continuous model proceeds along the lines of the argument of a genetic versus an environmental approach to human behavior. Persons who argue for a genetic explanation of alcoholism development, such as Goodwin (1979), claim that there are certain individuals who are predisposed to the disorder because of a genetic influence. Proponents of an environmental explanation for alcoholism development, such as Roe (1945), claim that individuals become alcoholic because of environmental pressures. Class variables have a rather specific etiology that suggests a genetic influence, while continuous variables have a rather diffuse etiology, suggesting little or no genetic influence (Gangestad and Snyder, 1985). Thus, if alcoholism can be determined to be a class variable, using Meehl's (1977)

taxometric techniques, it is much more likely to be genetic in origin than if it is a continuous variable.

To understand why it is more likely that a class variable--rather than a continuous variable--is genetic in origin, we need first to consider the etiology of the two variables. Of prime importance to this understanding is the concept of normality. The continuous variable is likely to be normally distributed because numerous independent antecedent events have all contributed to its development (Gangestad & Snyder, 1985). This diffuse pattern of etiology is compatible with learning theory. Strict learning theory would subscribe to the notion that it is not genetics but environment that plays the major role in the development of personality. Personality does not result from an underlying genetic predisposition but rather unfolds because of our interaction with the environment.

Class variables, on the other hand, are not normally distributed; they are discretely distributed. The etiology is not diffuse, it is specific. As Gangestad and Snyder (1985, p. 321) note: "Specific etiology refers to the operation of a necessary and sufficient factor, or a necessary but not sufficient factor, which is itself a discrete entity." In other words, if alcohol dependence were entirely genetic in origin, the latent class variable would be the only factor necessary for its development. It has been shown that, while genetics probably plays a role in the development of alcohol dependence, the environment is important as well. Thus, it seems more likely

that the latent variable is a necessary but insufficient factor in the development of dependence. More simply put, class variables are discretely distributed and therefore diffuse causation is not the proper model for this conceptualization. The observable behaviors descriptive of alcohol dependence are probably not the result of the interaction of independent antecedent events but rather are the result of an interaction between the underlying genetically-based factors and the environment.

Testing the Class Model

Based on the evidence from twin studies, adoption studies, family studies, animal studies, and genetic marker studies, there exists sufficient reason to conjecture that the etiology of the behavior seen in alcohol dependence is at least partly genetic in nature. Therefore, we have sufficient reason to test for the presence of a class variable in the etiology of alcoholism.

Utilizing the Technology

We utilized techniques of taxometric analysis that originated with Meehl and were later delineated by Gangestad and Snyder. The basis for this technology is provided by the following assumption (Gangestad & Snyder, 1985): if a class variable exerts strong influence on some domain of observable events, then these events are discontinuously, rather than

continuously, distributed. Specifically, a class variable will exhibit a particular pattern among the covarience of its indicators. Thus, we examined the covariances among a set of indicators between alcoholics and nonalcoholics to see if they exhibited this pattern. If we look at covariances over the levels of the underlying variable, the plot of the covariances should be peaked toward the middle.

METHOD

The Indicators

The Drinking History Questionnaire, the MacAndrew Scale, the Comprehensive Drinker Profile, the Mortimer Filkens Test and the Western Personality Inventory were examined for 60 items (Appendix A) from which we could choose a set of ten indicators. A pilot study was conducted on the 60 items to determine which items were related between groups but not within groups. The items were given to 50 alcoholics, identified as such by their responses to the Drinking History Questionnaire and to 50 nonalcoholics, identified as such by responses to the Drinking History Questionnaire. Those ten items (Appendix B) with the highest correlation between groups but lowest correlation within groups were chosen for the actual study. Ideally, the items should only intercorrelate in a sample because they discriminate between the two classes. They should be relatively independent

of one another in order to map the construct more thoroughly. For example, we would not want to choose two obviously highly correlated items such as "I have a hard time stopping drinking after one or two drinks" and "I sometimes find it difficult to stop drinking once I have started."

Subjects

The indicators were given to 125 male alcoholics, identified as such by responses to the Drinking History Questionnaire. The indicators were also given to 200 male nonalcoholics, identified as such by responses to the Drinking History Questionnaire. Females were excluded due to apparently differing base rates for alcoholism.

The alcoholic subjects were males involved in alcoholism treatment at Galen State Hospital, Warm Springs, Montana, Montana State Prison, Deer Lodge, Montana, Rocky Mountain Treatment Center, Great Falls, Montana, Providence Treatment Center, Great Falls, Montana, and Recovery Foundation, Missoula, Montana. They also included members of Alcoholics Anonymous in Missoula, Montana and Psychology 110 students at the University of Montana. The Psychology 110 students participated in the study as a course requirement. The rest of the alcoholic population volunteered to complete the questionnaires. The average age of the alcoholics was 31.0

The nonalcoholic subjects included members of Bethel Baptist, First Evangelical, and Christian Missionary Alliance

Churches in Missoula, Montana. All volunteered to complete the questionnaires. Other nonalcoholic subjects were Psychology 110 students at the University of Montana who completed the questionnaires to fulfill course requirements. The average age of the nonalcoholics was 37.8

Data Analysis

Covariances among the items were plotted by level of response to the indicators (Figure 1). The covariance between each of 45 possible item pairs was plotted for eight levels of responses to the indicators. The levels ranged from 0 alcoholic responses to the remaining 8 items to 8 alcoholic responses to the remaining 8 items.

RESULTS

Figure 1 clearly shows that the plot of the covariances among items by level of response to the indicators peaks toward the middle (at number 3). As mentioned previously, this particular pattern is indicative of the existence of a class variable. In addition, an independent base rate estimation yielded a base rate of .381 (meaning that the original population was 38.1% alcoholic and 61.9% nonalcoholic). To obtain that figure, for each individual item the total number of alcoholic responses was divided by the total population. That figure was then averaged for the ten items. The resulting average was .381.

This compares with an actual sample of 38.5% alcoholic and 61.5% nonalcoholic. Since this calculation is independent of the computation of the covariance plot, it provides independent support for a genetic basis for alcoholism. It should be noted that attempts to use Meehl and Golden's (1982) methods of base rate estimation, based on sketchy descriptions, failed to produce reasonable values and Meehl and Golden's counsel is being sought concerning the computations involved. This matter not withstanding, the excellent agreement between the simplest base rate estimation and the proportion of alcoholics in the sample provides support for the results.

DISCUSSION

The results clearly indicate that alcoholism has a latent class variable underlying its development. The plot of the covariances by level of responses to the indicators yielded a curve that was unmistakably peaked in the central part, indicative of the existence of a class variable. In addition, working backwards, the base rate for alcoholism in our population was reproducible from the data. Since this is independent of the computation used to obtain the covariance curve, it provides a control measure and strengthens the argument that alcoholism is a class variable. It either exists or it does not; there is not a continuum.

Implications for Alcoholism Development and Treatment

The results of this study may be most important for the understanding they provide concerning the origins of alcoholism and the implications for its treatment. There is evidence from family, twin, animal, adoption studies and now, from the unique perspective of taxometric analysis, that alcoholism has a major, if not overriding, genetic component. Of all these, taxometric analysis, alone, avoids the pervasive problem of alcoholism definition. As such, it provides the most conclusive evidence yet for the heritability of alcoholism. As mentioned earlier, the existence of a class variable suggests specific as opposed to diffuse etiology. A class variable, with its specific etiology, is much more likely to be genetic in origin than is a continuous variable, with its diffuse etiology.

In looking at alcoholism treatment, there are nearly always two arguments that are encountered. One is whether alcoholism results from personality problems and life difficulites or whether alcoholism causes personality problems and life difficulties. In using the same set of data, Vaillant and Milofsky (1983), and Zucker and Lisansky Gomberg (1986) reach different conclusions. Vaillant and Milofsky suggest that life problems stem from alcoholism and Zucker and Lisansky Gomberg suggest that alcoholism results from life problems. Given the present results, we cannot ignore the importance that genetics plays in the biology of alcoholism. There is a major genetic component to alcoholism and it only makes sense that the predisposed individual be extremely careful with his or her

alcohol use.

This conclusion leads to the second argument one encounters: the controlled drinking versus abstinence argument. This controversy is a continuing one (Taylor, Helzer and Robins, 1986; Cook, 1985). This study adds to the growing body of evidence that alcoholism is not merely learned; there are real differences between the alcoholic and the nonalcoholic. An analogy can be drawn to something as simple as diabetes and sugar. Just as the diabetic can best avoid symptoms of diabetes by avoiding sugar, so can the alcoholic best avoid symptoms of alcoholism by avoiding alcohol. With intake under control, proper treatment can help the alcoholic deal with the psychosocial aspects of the problem and learn how to prevent relapse.

The implications for prevention of alcoholism are clear. Those with a family background of alcoholism must be made aware of the large risks inherent to them should they make the personal choice to use the chemical. And, given the high probability of relapse (Brownell, Marlatt, Lichtenstein, and Wilson, 1986) the most sensible approach to the problem is probably prevention. The key to prevention is education. With adequate education concerning the risks genetics poses for the developement of alcoholism, people will be able to make informed decisons concerning their chemical use before alcoholism has had a chance to develop.

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APPENDIX A

60 ALCOHOLISM INDICATORS

1. Drinking helps me feel more confident.
2. Drinking seems to ease personal problems.
3. I sometimes feel bad about my drinking.
4. I am always able to stop drinking when I want to.
5. I have neglected my obligations, my family, or my work for two or more days in a row because of drinking.
6. I have had trouble remembering what I did the night before while I was drinking.
7. I sometimes need a drink or two in the morning to get going.
8. I have gone to someone for help with my drinking.
9. I am able to drink more now than I used to without feeling the same effect.
10. Friends and relatives think I am a normal drinker.
11. My relatives are upset with the way I live.
12. I am sometimes bothered by nervousness (irritable, fidgety or tense).
13. My judgement is better than it ever was.
14. I have recently undergone a great stress.
15. I have never been in trouble with the law
16. I sweat very easily even on cold days.
17. I am moderate in all my habits.
18. I do not feel that I have abnormal problems.
19. I have lived the right kind of life.
20. I would like to wear expensive clothes.
21. I like to read newspaper articles on crime.
22. I can not keep my mind on one thing.
23. I wish that I could be as happy as others seem to be.
24. My home life is as happy as it should be.
25. Drinking helps me make friends.
26. There is a history of problem drinking in my family.
27. Much of the time I feel that I have done something wrong or sinful.
28. I enjoy a race or game more when I bet on it.
29. I like (or liked) school.
30. I readily become one hundred per cent sold on a good idea.
31. I am certainly lacking in self-confidence.
32. I wish people would stop telling me how to live my life.
33. A drink or two gives me energy to get started.
34. 4 or 5 drinks affect my driving.
35. I have never been in trouble with the law.
36. I know who is responsible for most of my troubles.
37. My drinking has never caused problems between my spouse (boyfriend/girlfriend, other family members) and me.
38. I often become quarrelsome and abusive when I drink.
39. I like to cook.
40. My parents often objected to the kind of people I went around with.
41. I am a good mixer.

42. I frequently notice that my hand shakes when I try to do something.
43. I was fond of excitement when I was a child.
44. Evil spirits possess me at times.
45. Many of my dreams are about sex matters.
46. I seem to make friends about as quickly as others do.
47. I drink when I get angry.
48. If I were a reporter, I would very much like to report sporting news.
49. I have few or no pains.
50. I drink because I need it when I am tense or nervous.
51. I have a cough most of the time.
52. I pray several times every week.
53. I drink because I like the taste.
54. I do many things which I regret afterward (I regret things more or more often than others seem to).
55. I drink when I want to forget everything.
56. My table manners are not quite as good at home as when I am out in company.
57. I drink because it helps me to forget my worries.
58. In school, I was sometimes sent to the principal for cutting up.
59. My soul sometimes leaves my body.
60. I have been quite independent and free from family rule.

APPENDIX B

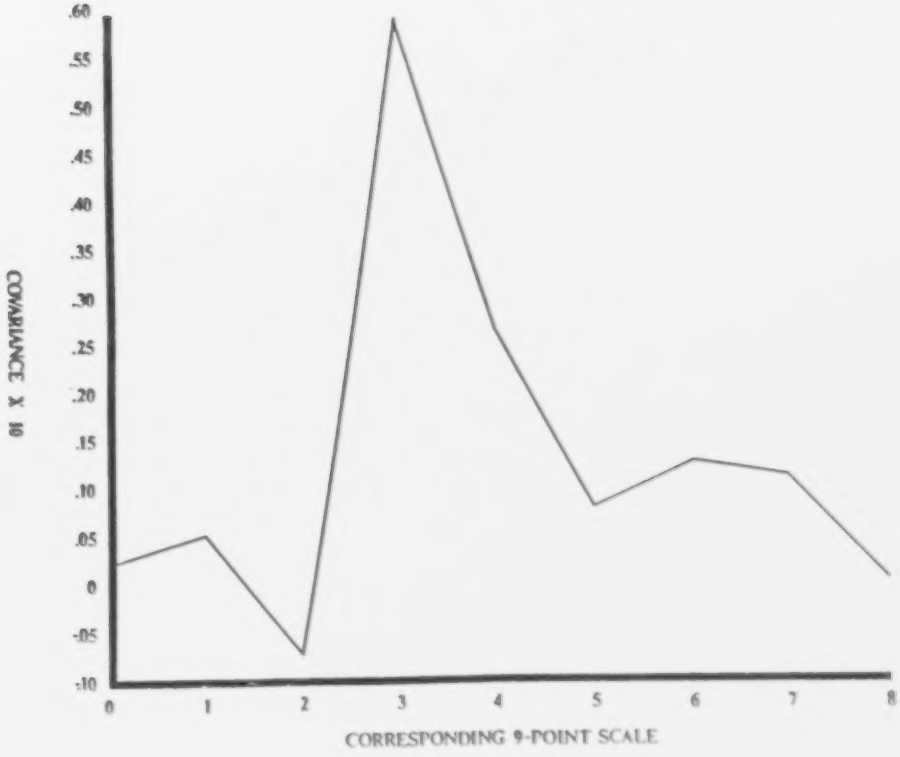
THE TEN INDICATORS

This questionnaire is for males only. Be sure to put your age in the upper right hand corner. It is not necessary to give your name.

For these questions a true or false answer is needed. Please respond to every statement. Do not spend too much time on any one question. Answer each question in the order in which it appears. In the space to the left of the number of the question, place an F for statements that don't fit for you and a T for statements that do fit for you. There are no right or wrong answers.

1. I am always able to stop drinking when I want to.
2. I often become quarrelsome and abusive when I drink.
3. I have lived the right kind of life.
4. I drink when I get angry.
5. My drinking has never caused problems between my spouse (boyfriend/girlfriend, other family members) and me.
6. I am moderate in all my habits.
7. I sometimes need a drink or two in the morning to get going.
8. I have neglected my obligations, my family, or work for two or more days in a row because of drinking.
9. My home life is as happy as it should be.
10. I drink because it helps me to forget my worries.

FIGURE 1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